



UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE  
United States Patent and Trademark Office  
Address: COMMISSIONER FOR PATENTS  
P.O. Box 1450  
Alexandria, Virginia 22313-1450  
www.uspto.gov

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
-----------------	-------------	----------------------	---------------------	------------------

10/710,421	07/09/2004	Shih-Chang Shei	12119-US-PA	4420
------------	------------	-----------------	-------------	------

31561                      7590                      12/19/2005

JIANQ CHYUN INTELLECTUAL PROPERTY OFFICE  
7 FLOOR-1, NO. 100  
ROOSEVELT ROAD, SECTION 2  
TAIPEI, 100  
TAIWAN

EXAMINER
----------

NGUYEN, JOSEPH H

ART UNIT	PAPER NUMBER
----------	--------------

2815

DATE MAILED: 12/19/2005

Please find below and/or attached an Office communication concerning this application or proceeding.

AK

<b>Office Action Summary</b>	<b>Application No.</b>	<b>Applicant(s)</b>	
	10/710,421	SHEI ET AL.	
	<b>Examiner</b>	<b>Art Unit</b>	
	Joseph Nguyen	2815	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

**Period for Reply**

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

**Status**

- 1) ☒ Responsive to communication(s) filed on 07 November 2005.
- 2a) ☒ This action is **FINAL**.                      2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

**Disposition of Claims**

- 4) ☒ Claim(s) 1-8,10-22 and 24-28 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_\_ is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 1-8,10-22 and 24-28 is/are rejected.
- 7) ☐ Claim(s) \_\_\_\_\_ is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

**Application Papers**

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 09 July 2004 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

**Priority under 35 U.S.C. § 119**

- 12) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☒ All    b) ☐ Some \* c) ☐ None of:
1. ☒ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

\* See the attached detailed Office action for a list of the certified copies not received.

**Attachment(s)**

- |  |   |
|--|---|
| 1) <input type="checkbox"/> Notice of References Cited (PTO-892)   | 4) <input type="checkbox"/> Interview Summary (PTO-413)<br>Paper No(s)/Mail Date. _____ |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948)                                   | 5) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152)             |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)<br>Paper No(s)/Mail Date _____ | 6) <input type="checkbox"/> Other: _____  |

## **DETAILED ACTION**

### ***Claim Rejections - 35 USC § 112***

The following is a quotation of the second paragraph of 35 U.S.C. 112:

The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

Claim 8 is rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

Claim 8 recites the limitation "the P transparent conductive oxide layer" in line 2. There is insufficient antecedent basis for this limitation in the claim. The term "P transparent conductive oxide layer" is not previously referred to in claim 3 from which claim 8 depends.

### ***Claim Rejections - 35 USC § 102***

The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

Claims 1-3 and 10-12 are rejected under 35 U.S.C. 102(b) as being anticipated by Sheu (US 2002/0179914).

Regarding claim 1, Sheu discloses in figure 2B a flip chip light emitting diode package comprising a Schottky diode comprising a sub-mount 42, 44 (para [0008], lines 8-9) having a first surface and a second surface; an ohmic contact layer 46b disposed on a portion of the first surface and the second surface of the sub-mount; and a Schottky contact layer 46a disposed on a portion of the first surface of the sub-mount and electrically contacts with the sub-mount, wherein the ohmic contact layer and the Schottky contact layer are electrically isolated; and a light emitting diode 32, 34 (para [0008]) disposed on the Schottky diode by flip chip bonding process, wherein the light emitting diode and the Schottky diode are connected reverse and in parallel (figure 2A showing the same embodiment).

It is noted that layers 46b, 46a are formed of metal (para [0008], lines 9) and therefore can function as "ohmic contact" and "Schottky contact" respectively. Further, the sub-mount comprises 42, 44 and Schottky contact layer 46a electrically contacts portion 44 of the sub-mount, as such, the Schottky contact layer electrically contacts the sub-mount as claimed.

Regarding claim 2, Sheu discloses in figure 2b a plurality of solder bumps 50 (para [0008], line 10) disposed between the Schottky diode and the light emitting diode so that the Schottky diode and the light emitting diode are connected reverse and in parallel (figure 2A).

Regarding claim 3, Sheu discloses in figure 2b the light emitting diode comprises a substrate 32; a semiconductor layer disposed on the substrate wherein the semiconductor layer at least comprises a first conductive type doped semiconductor

Art Unit: 2815

layer 34, a second conductive type doped semiconductor layer 36 and the light emitting layer (conventionally, this light emitting layer sandwiched between the first conductive type layer and the second conductive type layer); a first electrode 38b disposed on the first conductive type doped semiconductor layer 34; and a second electrode 38a disposed on the second conductive type doped semiconductor layer 36. (See para [0008]).

Regarding claims 10-12, Sheu discloses in figure 2b the sub-mount 42, 44 comprises an N doped material and a P doped material and the material forming the sub-mount is selected from a group consisting of Si. (See para [0008], lines 8-9).

### ***Claim Rejections - 35 USC § 103***

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

Claims 4-8 are rejected under 35 U.S.C. 103(a) as being unpatentable over figure 2B of Sheu in view of figure 3B of Sheu.

Regarding claim 4, figure 2B of Sheu shows substantially all the structure set forth in claim 4 except the material forming the first electrode being Ti/Al. However, figure 3B of Sheu shows the first electrode 116 is formed of Ti/Al (para [0040]). In view of such teaching, it would have been obvious at the time of the present invention modify

figure 2B of Sheu by having the first electrode formed of Ti/Al to obtain a good ohmic contact in a light emitting diode (para [0040], Sheu).

Regarding claims 5-8, similar to claim 4, the combination of figure 2B of Sheu and figure 3B of Sheu shows the second electrode 114 is formed of Ni/Au or an n type transparent conductive oxide (ITO) or  $\text{CuAlO}_2$ .

Claims 13-14 are rejected under 35 U.S.C. 103(a) as being unpatentable over Sheu in view of Yonezawa et al. (US 20040157432).

Regarding claims 13 and 14, Sheu et al. discloses material forming the ohmic contact layer comprises copper (para [0063], lines 10-11), not aluminum (claim 13) or titanium (claim 14). However, Yonezawa et al. discloses on para [0055] copper and aluminum and titanium can be alternatively used to form the conductive film. Note that this conductive film can be used as an ohmic contact. In view of such teaching, it would have been obvious at the time the present invention to modify Sheu by having the ohmic contact layer comprising aluminum or titanium because they (Cu, Ti, Al) are recognized in the art as equivalents.

Claims 15-22 and 24-26 are rejected under 35 U.S.C. 103(a) as being unpatentable over Sheu in view of Ikeda (US 6,900,698).

Regarding claim 15, Sheu discloses in figure 5 substantially all the structures set forth in the claimed invention (see rejection of claim 1) except a plurality of Schottky diodes being electrically connected in series. However, Ikeda discloses on figure 1B a

Art Unit: 2815

plurality of Schottky diodes being electrically connected in series (col. 1, lines 65-67). In view of such teaching, it would have been obvious at the time of the present invention to modify Sheu by having a plurality of Schottky diodes being electrically connected in series to improve the ESD resistance without impairing the characteristics of a high frequency device (col. 2, lines 9-10, Ikeda).

Regarding claims 16-22 and 24-26, similar to rejection of claims 2-8, Sheu discloses in figures 2B and 3B all the structures set forth in claims 16-22 and 24-26.

Claims 27-28 are rejected under 35 U.S.C. 103(a) as being unpatentable over Sheu and Ikeda in view of Yonezawa et al. (US 20040157432).

Regarding claims 13 and 14, Sheu discloses the material forming the ohmic contact layer comprises copper (para [0063], lines 10-11), not aluminum (claim 13) or titanium (claim 14). However, Yonezawa et al. discloses on para [0055] copper and aluminum and titanium can be alternatively used to form the conductive film. Note that this conductive film can be used as an ohmic contact. In view of such teaching, it would have been obvious at the time of the present invention to modify Sheu and Ikeda by having the ohmic contact layer comprising aluminum or titanium because they (Cu, Ti, Al) are recognized in the art as equivalents.

### ***Response to Arguments***

Applicant's arguments filed on 11/07/2005 have been fully considered but they are not persuasive.

With respect to claims 1 and 15, applicant argues figure 2B of Sheu shows the metal layer 46a electrically contacts with the p doped silicon layer 44 but does not electrically contact with the n doped silicon layer 42, and therefore the Schottky contact layer 46a in figure 2B of Sheu does not electrically contact with the sub-mount as recited in now amended claims 1 and 15. However, as explained above, the sub-mount in figure 2B of Sheu comprises the p-doped region 44 and the n doped region 42. As such, the Schottky contact layer 46a electrically contacts with the sub-mount via the p-doped region 44 since region 44 is also part of the sub-mount. In other words, figure 2B of Sheu meets the claimed feature.

Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP § 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire **THREE MONTHS** from the mailing date of this action. In the event a first reply is filed within **TWO MONTHS** of the mailing date of this final action and the advisory action is not mailed until after the end of the **THREE-MONTH** shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than **SIX MONTHS** from the date of this final action.




***Conclusion***

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Joseph Nguyen whose telephone number is (571) 272-1734. The examiner can normally be reached on Monday-Friday, 7:30 am- 4:30 pm. If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Ken Parker can be reached on (571) 272-2298. The fax phone number for the organization where this application or proceeding is assigned is (571) 273-8300 for regular communications.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

JN  
December 13, 2005.

  
**JEROME JACKSON**  
**PRIMARY EXAMINER**